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Fire Occurrence in the Northwest Planning Area, 1956-1982

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Fire Occurrence in the Northwest Planning Area 1956 - 1982

Table of Contents

List of Figures

List of Tables

FIRE OCCURRENCE IN THE NORTHWEST PLANNING AREA
BLM ALASKA, FAIRBANKS DISTRICT
1956-1982

INTRODUCTION

The Northwest Planning Area is located in west central Alaska (Fig. 1). Wildfires have been a very common occurrence in this part of the state. An analysis of fire occurrence has been made for all BLM lands within this planning unit. Blocks of land are found on the Seward Peninsula, in the Nulato Hills, and south of the western Brooks Range. The Buckland block, just east of the Seward Peninsula, contains all lands within the area of the Buckland Habitat Management Plan, including lands in the Central Yukon Planning area.

The analysis is based upon two sources: computerized BLM fire records for 1956-1982 and all fire reports which were available for that period. Basic information from all fire reports is stored on the Honeywell 6600 computer at the USDI Denver Service Center.

Fire information is fairly complete since the late '60's and early 70's and somewhat sketchy in earlier years, frequently because of low levels of fire detection in remote areas. Latitude and longitude were sometimes incorrectly noted on the original fire report, or miscoded. Fires may have been incorrectly located, and wrongly included in or omitted from the analysis. Locations for large fires were corrected if fire maps were available. Significant information may have been lost, however, if the coordinates for large fires incorrectly place them outside of the areas for which statistics were obtained. These types of errors are more prevalent in the earlier years of record.

Fire mapping and fire size estimates, particularly for unmanned fires, are not always accurate. Many unmanned fires were mapped crudely, if at all, and burned acreage estimates were only a guess. Sometimes only the starting point was located. However, these records are the only information on past fire occurrence in west central Alaska.

The period of record is too short, and number of fires per subunit are usually too few to permit a statistically significant analysis of fire activity. Variable levels of detection and suppression, and the non-homogenity of units in terms of topography and fuels further complicates the situation. Accurate fuels information cannot be obtained from fire reports. Fire weather and fire behavior is rarely noted. The analysis is therefore limited to a detailed compilation and calculation of information about fire occurrence. With location, site, and year being the most important factors, a reasonable estimate of levels of fire activity can be made.

METHODS

Computerized fire records were obtained for rectangular blocks of land which included all areas of BLM managed lands. State and native selected lands were not included. Records corresponded to 1:250,000 scale map overlays showing

Figure 1
Planning Subunits:
Northwest Planning Area

location of fire start, fire size class, fire number and year. All available fire reports for large fires were copied at the BLM State Office or Alaska Fire Service. However, records are incomplete for 1956 to 1963. 1964 through 1968 fire reports cannot be located.

All available fire maps were copied onto 1:250,000 scale maps. The amount of burned acreage on BLM land was estimated for all large fires which started on or burned onto BLM land.

All fires on BLM land were listed for each subunit, combining information from all map quads for each area. A sequential listing for the period 1956-1982 was compiled. Fire number, fire name, date of origin, fire size class, acreage, cause, and cost were pulled from the computer printouts.

Fires were tallied by size class for each year, and burned acreage and costs computed. The percentage of fires which were lightning fires, percentage of total area burned, average fire size, and number of fires per 100,000 acres was computed. Data was summarized by subunits and for the entire planning area.

Because fire control has limited the size of many fires, it is important to know which fires were not suppressed in order to draw some conclusions about the natural fire regime. The size of the suppression force was obtained from all available fire reports, and used as an estimate of the level of suppression effort. For those fires without fire reports, it was simply assumed that fires with costs at or near $0 were not manned. This is a gross assumption because inaccurate coding of costs per fire has affected these figures, and costs for unmanned fires were sometimes inflated by expenses for aircraft patrol or retardant. It is likely that fewer fires were manned than summaries show.

The number of fires and burned acreage were listed by calendar date for the entire period of record for each subunit. Cumulative number and percent of starts and burned acres were calculated. The burned acreage figure can be misleading because the entire burned acreage for a particular fire is assigned to the date when the fire began. However, the dates when burned acreage actually occurred usually cannot be determined from fire reports. (The dates when the fire was contained and controlled only indicate when all fire activity was over.)

From these cumulative summaries, the date when 60, 70, 80, and 90 percent of fires started, and the dates when the fires began which burned 60, 70, 80, and 90 percent of all burned acreage were pulled. The dates of the earliest and latest fires were also noted for each subunit.

Yearly and total costs were converted to 1967 and 1982 dollars, using the Consumer Price Index, U.S. cities average (Appendix A). Average cost for all fires affecting the subunit was calculated. The 1957 cost adjustment factor was used to adjust 1956 figures because no factor has been calculated for 1956.

Total suppression cost per subunit does not give a good indication of the relative amount of fire suppression effort because subunit acreage and fire occurrence vary considerably. Also, total cost figures include expenditures for large fires which burned on both sides of the subunit boundary. It is

frequently impossible to determine how many suppression dollars for a particular fire were spent within the subunit or on areas of the fire outside of the subunit. A cost per acre of subunit (total suppression dollars/subunit acres) can give a relative idea of suppression effort considering differences in subunit size, but must be adjusted to compensate for expenditures on some large fires. The estimated percent of fire acreage which burned within the subunit was calculated for each fire which burned across a subunit boundary. Then the total cost for that fire was multiplied by the percent of acres which that fire burned within the subunit. These modified fire costs were used to adjust total fire costs per subunit, and used in the calculation of average fire cost and cost per subunit acre.

INDIVIDUAL UNIT SUMMARIES

Sheklukshuk Subunit

The Sheklukshuk subunit (528,720 acres) lies along the Arctic Circle just south of the Brooks Range, with the Pah River Flats in the east and Selawik Flats just west of the subunit (Fig. 2). The Sheklukshuk subunit has the highest density of fire occurrence in the Northwest Planning Area for the period 1956-1982, 7.4 fires per 100,000 acres. Thirty-nine known fires, 38 lightning caused, burned about 31% of the subunit, a total burned acreage of about 174,000 acres (Table 1).

Twenty-three fires were less than 100 acres, seven fires ranged from 100 to 1000 acres, three fires were 1000 to 5000 acres, and six fires greater than 5000 acres affected the area (Table 2). Eight fires were never manned, the largest of which grew to 8,960 acres, burning 6400 acres within the unit. Six of the unmanned fires were less than 100 acres at final size.

Fire starts have been distributed fairly evenly across the area, with the exception of the north slopes of the Purcell Mountains where no fires are known to have occurred. Most fires have started between the second week of June and about July 24 with 19 fires in June and 17 in July. Large fires in 1972 and 1977 were not controlled until late August and mid-September.

Fires have occurred in 13 of the past 27 years, with the most starts occurring in 1970. More than 5000 acres burned in 1959, 1970, 1971, 1972, and 1977. The 98,924 acres which burned in 1977 and the 41,600 acres which burned in 1972 were the largest yearly burned acreages (Table 2).

The second largest fire to affect the area started on July 8, 1972, #8673 (Appendix 2), which covered a total of 86,720 acres, burning 41,600 acres in the subunit in the Pah River Flats. Fourteen people manned the southern perimeter of that fire near Hogatza. In 1977, two large fires occurred which both received a major suppression effort. The Kiliovil fire, #8705, started July 16, and burned 171,000 acres, including about 98,000 acres in the Kiliovilik and Sheklukshuk Ranges within the subunit. Three hundred three people and $709,027 (1977 $) were used to contain this fire, which burned within 8 miles of Shungnak. Final fire size was reached by August 7, after which rains and moderate weather permitted containment, and then control on September 11. About 1000 acres in the northeastern Pah River Flats were burned by fire #8889 which

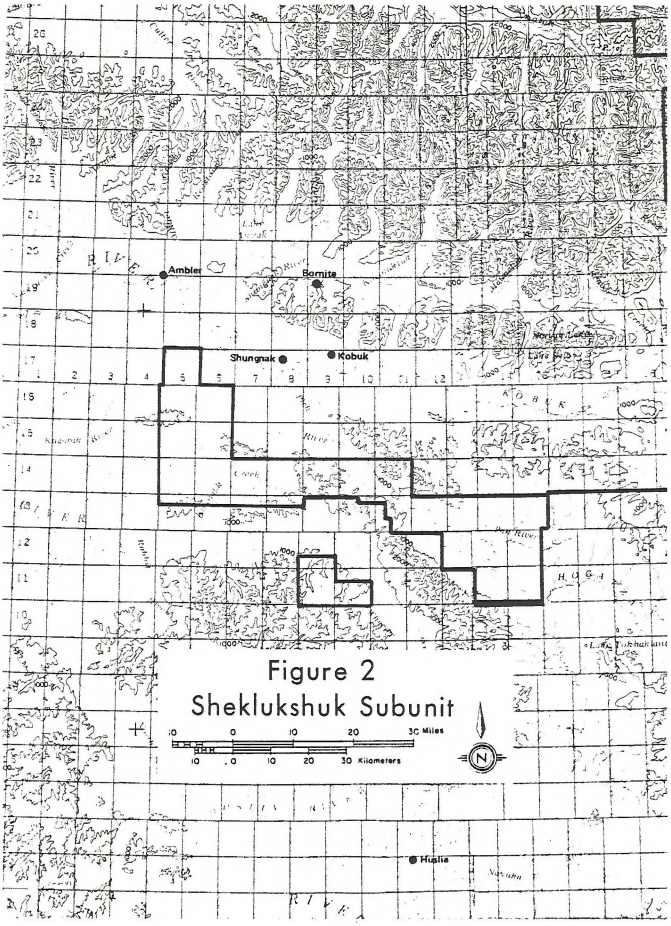

Figure 2
Sheklukshuk Subunit

Table 1. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
SHEKLUKSHUK SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
43	Purcell	6-14-56	D	200	Lightning	0	20
108	Hog River	9-07-58	B	8	"	---	739
110	Hog River	9-07-58	D	200	"	0	0
86	Pah River	6-19-59	F	3,000	"	19	6,810
87	Purcell Mtn.	6-20-59	E	480	"	---	3,704
219	Shungnak	6-20-59	G	2,000	Misc.	0	0
218*	Angutikada Peak	6-30-59	G	6,400	Lightning	0	0
54	Arctic Circle S 5	6-21-63	B	2	"	0	0
28	Black River	6-15-64	D	150	"	---	4,523
9602	Lockwood	7-02-70	B	1	"	---	430
9609	Judicial	7-02-70	B	3	"	---	470
9610	Totzi	7-02-70	D	110	"	---	540
9611	Arctic Circle	7-02-70	A	0**	"	---	2,350
9612	Puddle	7-02-70	A	0	"	---	0
9614	Ac	7-02-70	C	25	"	0	3,610
9929	Kaf	7-04-70	A	0	"	---	400
9596	Holiday Creek	7-04-70	C	75	"	0	32,340
9937	Cascade Lake	7-05-70	G	14,480	"	64	57,580
8614	Holiday Creek	6-22-71	F	1,500	"	0	3,661
8641	Pick	6-22-71	E	500	"	---	4,249
8685	Zane	6-24-71	C	20	"	0	0
8710	Question Mark	6-24-71	C	20	"	---	256
8735	Sharuckik Mtn.	6-25-71	F	4,000	"	---	206
8673	Pah River	7-08-72	G	41,600	"	14	29,171
8591	Zane	6-20-74	B	7	"	4	4,645
8615	Mac	6-21-74	B	1	"	2	914
8698	Lime	6-25-74	E	300	"	7	9,212
8683	Aldha Creek	7-23-76	A	0	"	2	2,501
8711	BTT S 38km	7-24-76	A	0	"	2	228
8713	Flats	7-24-76	B	0	"	2	1,052
8714	Zane Pass	7-24-76	A	0	"	2	710
8675	Headwater	7-16-77	B	1	"	6	94
8678	Pah Flats	7-16-77	B	3	"	8	1,680
8705	Kiliovil	7-16-77	G	97,920	"	303	709,027
8889*	Pah River	7-30-77	G	1,000	"	92	252,217
8547	DCK SW 22	6-06-79	B	3	"	0	4,245
8571	DCK SE 32	6-06-79	C	35	"	6	2,189
8573	DCK SW 24	6-06-79	B	3	"	0	88
8547	Chris	6-12-81	B	3	"	4	1,302

* Started outside subunit boundary
** Fires less than 1/4 acre are recorded as 0 acres in the computerized fire statistics.

Table 2. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
SHEKLUKSHUK SUBUNIT

	Number of Fires	Number of Fires by Size Class*/ No. of Unmanned Fires								Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
		A	B	C	D	E	F	G	C**				
1956	1				1/1					200	20	24	69
1957													
1958	2		1		1/1					208	739	853	2,466
1959	4					1	1	1/1	1/1	11,880	10,514	12,044	34,819
1960													
1961													
1962													
1963	1		1/1							2	0		
1964	1				1					150	4,523	4,869	14,076
1965													
1966													
1967													
1968													
1969													
1970	9	3/1	2	2	1			1		14,694	97,720	84,024	242,913
1971	5			2/1		1	2			6,040	8,372	6,902	19,954
1972	1							1		41,600	29,171	23,281	67,305
1973													
1974	3		2			1				308	14,771	10,001	28,913
1975													
1976	4	4								0	4,491	2,634	7,615
1977	4		2					1	1	98,924	963,018	530,588	1,533,930
1978													
1979	3		2	1/1						41	6,522	3,000	8,673
1980													
1981	1		1							3	1,302	4,789	13,845
1982													
Total	39	7	11	5	4	3	3	4	2	174,050		683,009	1,197,578
Unmanned	8	1	1	2	2	0	0	1	1				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

***Consumer Price Index, U.S. Cities average, was used to adjust costs. See appendix A for adjustment factors used.

began on July 30. After initial attack was made, the fire was demanned until August 20. The final 5,000 acres of the fire burned in early September. Twenty-four hours of rain beginning September 6 put an end to fire activity. Ninety-two people worked the fire and $252,217 was spent.

Extensive areas of black spruce and tussock tundra, coupled with a continental climate, will cause a continued high fire occurrence and potential for large fires in this subunit. However, fire spread will be limited in burned areas until a fairly continuous layer of dead fuel and lichens has again developed.

Squirrel River Subunit

The Squirrel River subunit, about 810,200 acres, is located in the northern section of the planning area. Most of the west, north and east boundaries lie in the Baird Mountains of the western Brooks Range (Fig. 3). The analysis does not include an isolated block of about three townships located about 30 miles northwest of the Squirrel River Block.

In the period 1956 to 1982, 13 fires burned in the subunit, all of which were lightning caused (Table 3). An estimated 2,869 acres burned, about 0.35% of the total subunit acreage. Seven of the fires were less than 10 acres, five fires ranged between 10 and 100 acres, and one 25,000 acre fire which started south of the area burned 2,000 acres in the subunit in the Kiana Hills (Table 4). All but two of these fires were manned.

No fires were reported for the Baird Mountains; seven fires were located in the southcentral part of the area along the Omar River, or Timber and Klery Creeks. Two fires were in the proposed Squirrel River Wild and Scenic River Corridor. Fires started in seven of the 27 years of record, with the most starts (4) reported for 1977.

Two fires have started in June, nine in July and two in August. The 25,000 acre 1977 fire west of Deviation Peak started July 24 and burned until August 25. The fire was initial attacked and then demanned on July 25. Crews again began working on August 13, and contained the fire with the aid of rain on August 18. The 2,000 acres of the subunit which burned in this one fire were 70% of the total reported burned acreage for the entire area.

It is probable that fuels are rarely dry enough to burn because of maritime influences and then only for a few days at a time. Also, spruce stands are frequently open with a well-developed shrub understory, which would greatly limit fire start and spread. Summer 1983 reconnaissance found no evidence of any large fires north of the Kiana Hills.

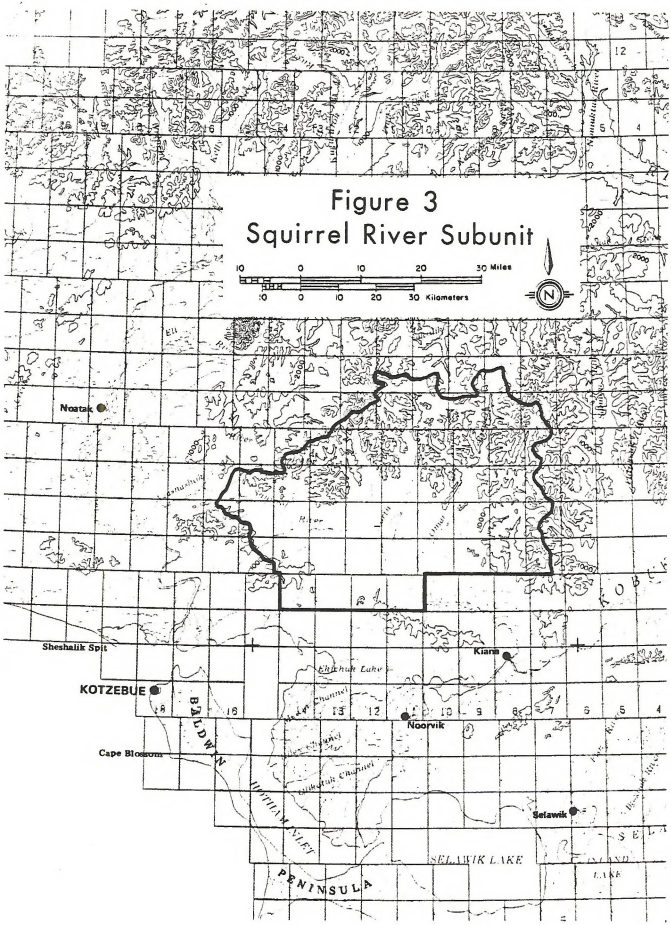
Figure 3
Squirrel River Subunit
10 0 10 20 30 Miles
10 0 10 20 30 Kilometers
N
Noatak
Sheshalik Spit
KOTZEBUE
Kiana
Kobuk River
Kotzebue Lake
Hotham Inlet
Kotzebue Channel
Noorvik
Cape Blossom
BALDWIN
PENINSULA
Selawik
SELAWIK LAKE

Table 3. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
SQUIRREL RIVER SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
61	Klery Creek	6-09-60	B	10	Lightning	--	3,234
1E4	Jack Creek	7-31-68	C	10	"	--	1,230
1E7	Squirrel River	8-01-68	C	40	"	0	0
8862	Squirrel River	7-15-72	C	70	"	--	18,740
8840	Deviation	8-06-74	B	5	"	0	0
8620	Squirrel	7-09-77	B	3	"	12	8,051
8621	North Fork	7-09-77	B	5	"	14	5,290
8622	Omar River	7-09-77	B	5	"	2	769
8778	IAN N 13	7-22-77	A	0**	"	2	4,206
8837*	OTZ NE 40	7-24-77	G	2,000	"	85	67,584
8601	IAN NW 17	6-17-81	E	700	"	6	30,539
8666	OTZ NE 40	7-25-81	B	1	"	2	4,119
8711	DCK W 107	7-13-82	C	20	"	4	5,863

* Started outside subunit boundary.
** Fires less than 1/4 acre are recorded as 0 acres in the computerized fire statistics.

Table 4. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
SQUIRREL RIVER SUBUNIT

	Number of Fires	Number of Fires by Size Class*/ No. of Unmanned Fires A	B	C	D	E	F	G	G**	Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
1956													
1957													
1958													
1959													
1960	1		1							10	3,234	3,646	10,541
1961													
1962													
1963													
1964													
1965													
1966													
1967													
1968	2			2/1						50	1,230	1,180	3,411
1969													
1970													
1971													
1972	1			1						70	18,740	14,956	43,238
1973													
1974	1		1/1							5	0		
1975													
1976													
1977	5	1	3						1	2,013	85,900	47,328	136,825
1978													
1979													
1980													
1981	2		1			1				701	34,658	12,723	36,782
1982	1			1						20	5,863	2,028	5,863
Total	13	1	6	4		1			1	2,869		81,861	236,660
Unmanned	2	0	1	1		0			0				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

West Nulato Hills Subunit

The West Nulato Hills subunit, covering about 1,652,000 acres, is located on the western half of the Nulato Hills, bordering along Norton Sound. It extends from approximately the 64th parallel (the BLM, Fairbanks-Anchorage District boundary), north to the Continental Divide. The eastern boundary is the border of the planning area (Fig. 4).

Only 32 fires, 31 lightning caused, have been reported for the period 1956-1982 (Table 5). However, 12.3% of the area, about 204,000 acres, have burned. Fires have occurred in 11 of the past 27 years, with the highest burned acreage in 1977. Only six fires were reported which were less than 10 acres; 13 fires were between 10 and 1000 acres; five fires ranged from 1000 to 5000 acres; and eight fires (Table 6) occurred which were larger than 5000 acres. It is likely that more fires have occurred, but were put out by rain or limited in size by the dissected topography and changes in fuel type. Only 59% of the reported fires have been manned. Eight of the nine fires between 300 and 5000 acres received no suppression action.

Seven lightning fires have started in June, 18 in July, and six in August. Most fire activity has stopped by the end of the third week in July, except in 1957 and 1977 when fires burned into mid-September.

Fires are distributed fairly even throughout the northern 2/3 of the block of land, with a few in the exteme south along the North River and North Fork of the Unalakleet River. None are recorded for the mountains southeast and east of the Shaktoolik River. The eight large fires (greater than 5000 acres) have occurred in the west central and northern part of the block.

Large fires have occurred in 1957, 1968, 1971, 1972 and 1977 (Appendix B). No suppression action was taken on the 65,920 acre Ungalik fire (#94) which started on June 9, 1957, burned 63,000 acres in the east central part of the block, and was declared out when patrolled on September 19. The 1977 fire #8827 on the Inglutalik River was also never suppressed, and eventually covered about 69,000 acres between July 24 and September 19. In 1972, four fires burned 45,880 acres, all starting on July 8 or 9, and were contained by July 13 through 16. The Akulik River fire (#8676) and Cable fires (#8680) were on the coastal plain, burned 13,000 and 14,000 acres, and were manned by 93 and 14 people respectively. Sixty-five people manned the 8,680 acre Little Bear fire (#8677) on the lower slopes of the Nulato Hills, above the Inglutalik River. Suppression action was taken by 14 people on the 10,200 acre Nigikmigoon fire (#8692) near the headwaters of the Inglutalik River. The 1971 Inglutalik River fire (#8761) was manned by 28 people, and burned 6,500 acres between June 28 and July 7. No information is available on the 6,000 acre Christmas Creek fire that started July 23, 1968.

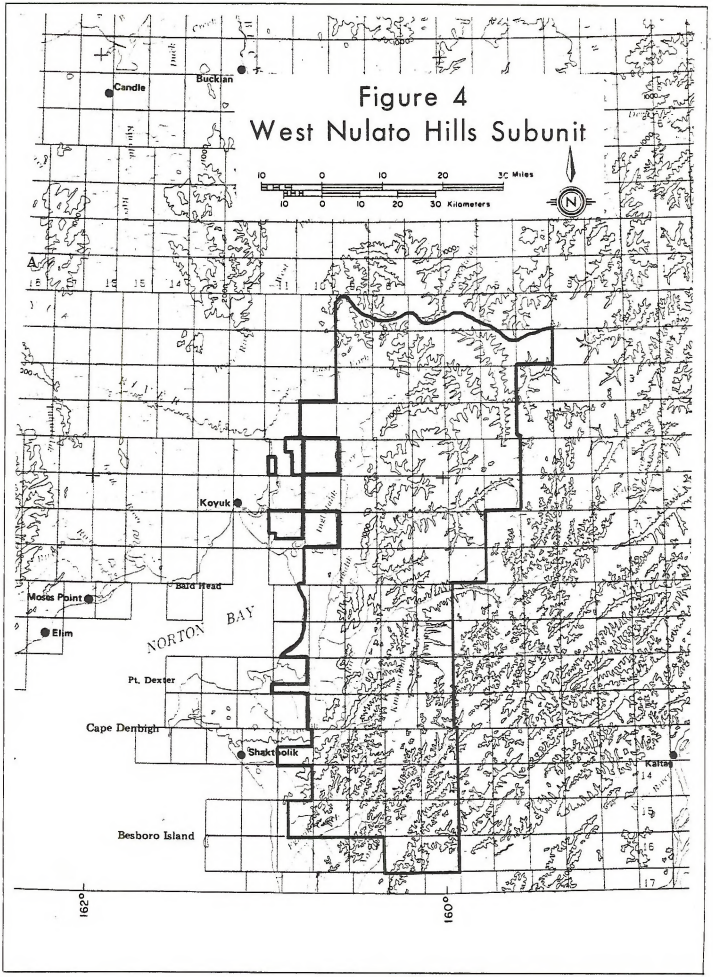
Figure 4
West Nulato Hills Subunit
10 0 10 20 30 Miles
10 0 10 20 30 Kilometers
N
Candle
Buckland
Koyuk
Moses Point
Bald Head
Elim
NORTON BAY
Pt. Dexter
Cape Denbigh
Shaktoolik
Kaltag
Besboro Island
162°
160°

Table 5. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
WEST NULATO HILLS SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
94	Ungalik	6-09-57	G	65,920	Lightning	0	316
34	Koyuk	6-01-58	D	200	"	--	930
66	Norton Bay	6-06-58	C	40	"	--	120
79	Haycock	6-06-58	B	2	"	0	0
22	Christmas Mtn.	5-19-60	F	2,350	Recreation	--	13,113
37K	Koyuk	6-16-65	C	75	Lightning	--	1,186
Z57	Hunt	8-10-66	C	80	"	--	5,610
062	North River	8-11-66	B	3	"	--	2,960
Y80	Third Cr.	7-09-68	D	150	"	--	9,450
Y81	Koyuk Fire	7-09-68	B	40	"	--	3,950
Z77	Christmas Cr.	7-23-68	G	6,000	"	--	1,730
6D3	Nulato River	7-24-68	F	1,900	"	0	0
7D9	Talik River	7-25-68	F	3,500	"	0	0
1E9	22 Mile Cabin	8-06-68	F	1,000	"	0	0
3E7	Arvesta Creek	8-25-68	E	500	"	0	0
3E8	Brass Pan Creek	8-25-68	F	1,600	"	0	0
8761	Inglutalik R.	6-28-71	G	6,500	"	28	13,577
8676	Akulik River	7-08-72	G	13,000	"	93	14,183
8677	Little Bear	7-08-72	G	8,680	"	65	38,961
8679	Norton Bay	7-08-72	D	100	"	0	0
8680	Cable	7-09-72	G	14,000	"	14	15,516
8692	Nigikmigoon	7-09-72	G	10,200	"	14	8,926
8820	Tumit	7-13-72	B	1	"	9	404
7806	Excalibur	7-13-72	E	950	"	0	0
8823	N. Fork River	7-13-72	E	500	"	0	0
8875	Debauch Mtn.	7-19-72	C	75	"	--	1,072
8738	Christmas Mtn.	7-16-74	C	10	"	8	4,401
8842	Swift	8-06-74	A	0**	"	0	1,491
8662	Ungalik	7-15-77	B	7	"	16	20,179
8827	GMT ESE 42	7-24-77	G	69,000	"	0	3,367
8848	Kila	7-25-77	E	300	"	0	2,474
8535	KKA SE 27	6-25-82	C	35	"	29	26,884

* Started outside subunit boundary.
** Fires less than 1/4 acre are recorded as 0 acres in the computerized fire statistics.

Table 6. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
WEST NULATO HILL SUBUNIT

	Number of Fires	Number of Fires by Size Class*/ No. of Unmanned Fires								Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
		A	B	C	D	E	F	G	G**				
1956													
1957	1							1/1		63,000	316	375	1,084
1958	3		1/1	1	1					242	1,050	1,212	3,504
1959													
1960	1						1			2,350	13,113	14,784	42,741
1961													
1962													
1963													
1964													
1965	1			1						75	1,186	1,255	3,628
1966	2		1	1						83	9,620	9,897	28,612
1967													
1968	8		1		1	1/1	4/4	1		14,690	15,130	14,520	41,977
1969													
1970													
1971	1							1		6,500	13,557	11,176	32,310
1972	9		1	1	1/1	2/2		4		47,506	79,062	63,098	182,416
1973													
1974	2	1/1		1						10	5,892	3,989	11,533
1975													
1976													
1977	3		1			1/1		1/1		69,307	26,020	14,336	41,445
1978													
1979													
1980													
1981													
1982	1			1						35	36,884	12,758	36,884
Total	32	1	5	6	3	4	5	8		203,798		147,400	426,134
Unmanned	13	1	1	0	1	4	4	2					

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

Buckland Subunit

The 2,073,600 acres of the Buckland subunit (Fig. 5) is just east of the Seward Peninsula, bounded by the Continental Divide to the south and east, by the Selawik Flats to the north, and approximately the 161 degree of longitude to the west.

Seventy-nine fires, all lightning caused (Table 7), have been reported for the Buckland subunit in the years 1956-1982. 222,468 acres burned, about 10.8% of the total area. Fires occurred in 13 of the past 27 years, although 74 of those 79 fires were recorded since 1968 (Table 8). Many more fires probably occurred during 1956-1967, but were never detected because of limited amounts of aircraft use and fire detection in the area. Many small fires in the Buckland basin were seen by Northwest Resource Area staff in the summer of 1982 which had started that year but were never reported by the Alaska Fire Service. Those fires appeared to have been ignited by lightning and been put out at a small size (less than five acres) by rain from the same storm.

During the period of record, 41 reported fires were less than 10 acres, 28 fires were 10 to 1000 acres, six fires were 1000 to 5000 acres, and four fires were larger than 5000 acres (Table 8). About 65% of these fires were manned (Table 8). Just over half of the 41 A and B size class fires (less than one acre) went out with no suppression action being taken. Suppression action on the four class G fires (greater than 5000 acres) was fairly limited.

All but three fires started in June (30) and July (46), and did most of their burning in those months. However, the large fires in 1957 and 1977 burned into September.

Fires have been scattered fairly evenly across the unit, although no fires were reported for the uplands along the Continental Divide. One concentration of fires is found along the South Fork of the Buckland River. However, 10 of those fires occurred on July 6, 1979, probably the result of one storm. The largest fires to occur in the Buckland River lowland during the period of record were 9,850 acres in July, 1970, and 6,000 acres in July, 1972 (Appendix B), both of which apparently went out without suppression action. While the records suggest that large fires do not occur in this area, the vegetation pattern shows that extremely large fires have occurred in what were probably exceptionally dry years. Fire size and spread seem to be limited in most years by the wet conditions caused by permafrost, drainage, and weather patterns.

Large fires have occurred in the Selawik Hills and in the uplands in the southeast part of the subunit. In 1977, fire #8689, starting on July 16, moved south into the subunit from the Selawik Flats. Initial attack was made, but the fire was demanned on July 23 because it was a low priority (Appendix B). No further action was taken. This 270,000 acre fire burned about 41,600 acres of the Buckland subunit. The 1957 fire Kateel River No. 1-5, was the result of five fires which burned together, and covered a total of 1,161,200 acres of the northern Nulato Hills between about June 10 and September 10. The fire burned about 143,600 acres of the subunit in the uplands east of the Tagagawik River. No suppression action was ever taken on this fire. These two fires account for 83% of the total burned acreage in the Buckland subunit.

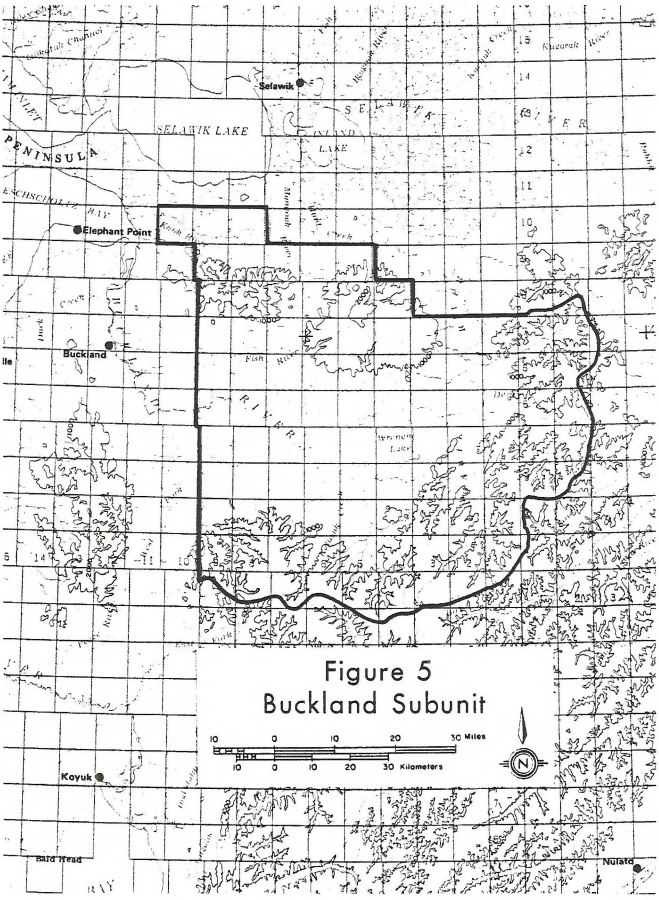

Figure 5
Buckland Subunit

Table 7. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
BUCKLAND SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
98*	Kateel River #1-5	5-10-57	G	143,360	Lightning	0	888
40	Dagarawik River #1	6-02-58	D	200	"	1	255
41	Dagarawik River #2	6-02-58	D	300	"	0	0
60	Dagarawik River #3	6-04-58	C	80	"	1	125
66	Kauk	6-14-60	E	800	"	--	4,730
Y88	Buckland	7-09-68	C	30	"	--	19,800
Y89	Dowely	7-09-68	B	5	"	--	650
Y93	South Fork	7-10-68	D	200	"	--	380
Y94	Middle Fork	7-10-68	A	0**	"	--	150
Y95	Tagagawik River	7-10-68	A	0	"	--	350
Z09	Cop	7-11-68	A	0	"	--	610
ZE2	Garnet	8-06-68	C	80	"	0	0
9622	Cotton	7-03-70	F	1,500	"	--	13,840
9632	Meander	7-04-70	G	9,850	"	--	420
9927	Buckland	7-04-70	F	3,570	"	--	280
9935	Flute	7-04-70	F	4,920	"	8	11,700
9936	Watch	7-04-70	E	600	"	13	7,260
9924	Tag River	7-04-70	C	50	"	0	80
9933	Tobacco	7-04-70	D	200	"	--	13,190
9940	Middle	7-07-70	B	1	"	0	40
9941	Brush	7-07-70	A	0	"	--	960
8775	Kalasuk Cr.	6-29-71	E	600	"	0	46,108
8776	Little Kalasuk Cr.	6-29-71	E	500	"	0	35,683
8777	Alukluk	6-29-71	C	20	"	--	591
8719	Flaz	7-10-72	F	1,900	"	0	1,546
8720	Tire	7-10-72	G	6,000	"	0	0
8818	Loman	7-15-72	F	1,200	"	44	10,354
8579	Green	6-20-74	C	15	"	6	5,989
8580	Carson	6-20-74	B	1	"	0	0
8582	Corral	6-20-74	B	1	"	2	688
8583	Brush	6-20-74	B	1	"	0	151
8588	Star (Kateel R.)	6-20-74	A	0	"	0	531
8693	Sleet	6-24-74	B	3	"	9	3,054
8694	Ukit	6-24-74	E	700	"	27	27,357
8717	Tagagawik	7-03-74	B	1	"	0	0
8746	Blind	7-03-74	B	1	"	0	0
8753	Windy	7-16-74	A	0	"	0	0
8756	Mid	7-16-74	A	0	"	0	0
8757	Wench	7-16-74	A	0	"	0	258
8758	Rock	7-16-74	A	0	"	0	0
8759	Andy	7-16-74	A	0	"	0	238
8739	Cow	7-16-74	B	1	"	2	2,951
8740	Cotton	7-16-74	A	0	"	2	1,147
8743	Boulder	7-16-74	A	0	"	2	1,708
8744	Fish River	7-16-74	B	1	"	2	17,408
8747	Dowey	7-16-74	C	18	"	6	2,909
8766	Wrench	7-16-74	B	1	"	0	0
8843	Garnet	8-06-74	B	5	"	2	15,423
8844	Kalusuk	8-06-74	D	200	"	4	2,799
8552	Kalusuk Cr.	6-13-76	E	700	"	25	49,072
8608	Noon	7-08-77	B	6	"	4	6,642
8604	Mangoak	7-08-77	C	10	"	6	365

Table 7. Buckland Subunit, Continued

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
8618	Dowey	7-09-77	C	25	Lightning	5	2,817
8634	Fish River	7-09-77	C	10	"	2	0
8660	Kauk River	7-15-77	A	0	"	6	91
8688	Tagagaw	7-16-77	B	5	"	0	0
8689*	Augus	7-16-77	G	41,600	"	67	15,842
8579	Green	6-20-74	C	15	"	6	5,989
8580	Carson	6-20-74	B	1	"	0	0
8582	Corral	6-20-74	B	1	"	2	688
8583	Brush	6-20-74	B	1	"	0	151
8588	Star (Kateel R.)	6-20-74	A	0	"	0	531
8693	Sleet	6-24-74	B	3	"	9	3,054
8694	Ukit	6-24-74	E	700	"	27	27,357
8717	Tagagawik	7-03-74	B	1	"	0	0
8746	Blind	7-03-74	B	1	"	0	0
8753	Windy	7-16-74	A	0	"	0	0
8756	Mid	7-16-74	A	0	"	0	0
8757	Wench	7-16-74	A	0	"	0	258
8758	Rock	7-16-74	A	0	"	0	0
8759	Andy	7-16-74	A	0	"	0	238
8739	Cow	7-16-74	B	1	"	2	2,951
8740	Cotton	7-16-74	A	0	"	2	1,147
8743	Boulder	7-16-74	A	0	"	2	1,708
8744	Fish River	7-16-74	B	1	"	2	17,408
8747	Dowey	7-16-74	C	18	"	6	2,909
8766	Wrench	7-16-74	B	1	"	0	0
8843	Garnet	8-06-74	B	5	"	2	15,423
8844	Kalusuk	8-06-74	D	200	"	4	2,799
8552	Kalusuk Cr.	6-13-76	E	700	"	25	49,072
8608	Noon	7-08-77	B	6	"	4	6,642
8604	Mangoak	7-08-77	C	10	"	6	365
8618	Dowey	7-09-77	C	25	"	5	2,817
8634	Fish River	7-09-77	C	10	"	2	0
8660	Kauk River	7-15-77	A	0	"	6	91
8688	Tagagaw	7-16-77	B	5	"	0	0
8689*	Augus	7-16-77	G	41,600	"	67	15,842
8725	Roller	7-17-77	F	2,000	"	0	0
8742	OTZ ESE	7-18-77	E	400	"	21	22,473
8537	GMT NE 38	6-06-79	D	250	"	6	3,182
8538	GMT NE 55	6-06-79	B	5	"	0	5
8539	GMT NE 42	6-06-79	B	5	"	0	0
8545	GMT NE 39	6-06-79	A	0	"	0	16
8548	GMT NE 40	6-06-79	D	200	"	12	4,909
8549	GMT NE 41	6-06-79	C	30	"	19	16,357
8550	GMT NE 37	6-06-79	B	3	"	2	562
8551	GMT NE 43	6-06-79	A	0	"	0	0
8552	GMT NE 44	6-06-79	A	0	"	0	719
8553	GMT NE 42	6-06-79	A	0	"	0	0
8557	GMT NE 45	6-06-79	B	5	"	5	4,234
8597	BCK NE 17	6-07-79	D	250	"	9	25,241
8611	GMT NE 63	6-07-79	B	3	"	2	2,861
8608	GAL NW 73	6-17-81	C	20	"	11	23,973
8658	GMT E 53	7-25-81	B	1	"	0	0
8659	GMT NE 27	7-25-81	B	0	"	0	0
8660	GMT NE 55	7-25-81	A	0	"	2	2,961
8617	GMT NE 40	7-08-82	B	1	"	2	756
8692	BKC E 13	7-12-82	C	25	"	8	8,275
8698	GMT NE 35	7-12-82	A	0	"	2	921

* Started outside subunit boundary

** Fires less than 1/4 acre are recorded as 0 acres in the computerized fire statistics.

Table 8. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
BUCKLAND SUBUNIT

Year	Total	No. of Fires by Size Class*/ No. of Unmanned Fires A	B	C	D	E	F	G	G**	Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
1956													
1957	1								1/1	143,360	888	1,053	3,044
1958		3		1	2/1					580	380	430	1,269
1959													
1960	1					1				800	4,730	5,333	15,418
1961													
1962													
1963													
1964													
1965													
1966													
1967													
1968	7	3	1	2/1	1					315	21,940	21,056	60,973
1969													
1970	9	1	1/1	1/1	1	1	3	1		20,691	47,770	41,075	118,748
1971	3			1		2				1,120	82,382	67,916	196,345
1972	3						2/1	1/1		9,100	11,900	9,497	27,456
1973													
1974	22	8/6	10/5	2	1					949	82,611	55,932	161,699
1975													
1976	1					1				700	49,072	28,781	83,206
1977	9	1	2/1	3		1	1/1		1	44,056	48,230	26,573	76,823
1978													
1979	13	4/4	5/2	1	3					751	58,086	26,718	77,242
1980													
1981	4	1	2/2	1						20	26,934	9,888	28,586
1982	3	1	1	1						26	9,952	3,442	9,951
Total	79	19	22	13	8	7	6	2	2	222,468		297,703	860,660
Unmanned	28	10	11	2	1	0	2	1	1				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

Bendeleben Subunit

The 1,523,180 acre Bendeleben Mountains Subunit is in the central and eastern part of the Seward Peninsula. The Kuzitrin River lowland lies to the west; the Koyuk River flows through the eastern section; and the Darby Mountains and McCarthy's Marsh comprise the south central portion of the unit (Fig. 6).

Twenty-nine fires, 28 caused by lightning, have affected BLM lands in this area in the period 1956-1982 (Table 9). 189,239 acres have burned, or 12.4% of the area. Eight fires were less than 10 acres, 13 fires ranged from 10 to 1,000 acres, and eight fires greater than 5,000 acres occurred (Table 10). It is likely that there have been many fires which were never detected, and went out at a small size. At least 10 of these 29 fires were never manned, including seven of the eight Class G fires (greater than 5,000 acres).

Fires have been reported along the Koyuk River, in the Darby Mountains, in McCarthy's Marsh and in the Kuzitrin River. No fires have been found in the Bendeleben Mountains. All fires but two started in June (8) and July (20), a period when most burned acreage has occurred. However, a fire burned until early September just east of the unit in 1977.

Fires have been reported in 12 of the last 27 years, but large fires have only happened in three years (Appendix B). In 1956, an 8,000 acre fire (#0011) burned on the Kuzitrin River, and 12,000 acres (#007) burned south of the Koyuk River. No suppression action was taken on these fires.

In 1971 two fires grew together and burned about 5,100 acres in the subunit southwest of Mt. Bendeleben. Also in 1971, three fires, numbers 8773, 8793 and 8749, burned 23,000, 25,000, and 18,560 acres in the Kuzitrin River area of the subunit. These fires were part of a group of large fires that started between June 26 and 29, and burned about 300,000 acres in the Kuzitrin Valley and Imuruk basins. None of these fires were suppressed, and all went out naturally by July 22.

In 1977, suppression action was taken on the July 9 Dry Canyon fire (#8633) which burned 47,000 acres in McCarthy's Marsh, and on the lower slopes of the eastern Bendeleben and Darby Mountains. The fire was contained on July 29 by suppression efforts and topography, and declared out on August 5. $155,123 was spent on that fire. Another 1977 fire (#8789) burned a total of 70,000 acres, about 49,920 in the subunit, along the north side of the Koyuk River. The fire was never manned, and declared out on August 3 when it burned into another fire. Action was taken on that second fire, #8780 (adjacent to the subunit), which was controlled with the aid of rainy weather on September 8.

It should be noted that in 1971 when 3 Class G fires burned in the western part of the subunit, there were no fires in the central or eastern part of the area. In 1977, when burning conditions in the central and eastern part of the subunit permitted the growth of large fires, there was no fire activity anywhere near the areas in the west that burned in 1971. 1956 was the only year in the last 27 which had Class G fires in both ends of the subunit. Those fires were only 8,000 and 12,000 acres and probably went out without suppression action.

This suggests that weather patterns favorable for large fire occurrence may rarely occur on the entire Seward Peninsula in the same period of time. Weather conditions permitting major fire activity in August have not developed in the southwestern Seward Peninsula in the last 29 years.

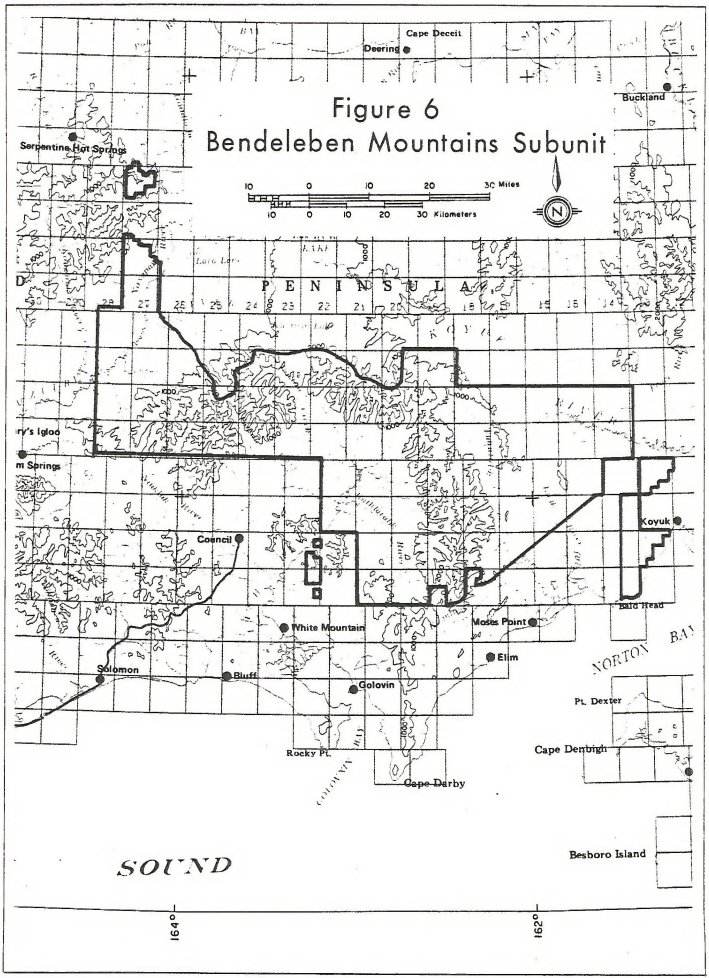
Figure 6
Bendeleben Mountains Subunit
Cape Deceit
Deering
Buckland
Serpentine Hot Springs
10 0 10 20 30 Miles
10 0 10 20 30 Kilometers
N
PENINSULA
Council
Koyuk
Bald Head
White Mountain
Moses Point
Elim
Solomon
Bluff
Golovin
Pt. Dexter
Rocky Pt.
Cape Denbigh
Cape Derby
Besboro Island
SOUND
NORTON BAY
164°
162°

Table 9. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
BENDELEBEN SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
007	Koyuk #1	6-21-56	G	12,000	Lightning	--	252
0011	Rainbow	7-11-56	G	8,000	Misc.	--	283
0010	Koyuk #3	7-13-56	C	10	Lightning	0	0
125	Koyuk #1	7-21-60	B	1	"	--	3,649
118	Granite Mtn.	7-21-60	C	25	"	--	1,221
126	Koyuk 2	7-21-60	B	2	"	--	2,721
15	Granite Mtn.	5-29-61	C	77	"	--	2,316
Y90	Kwik	7-09-68	B	1	"	--	3,310
9542	Death Valley	7-01-69	C	50	"	--	2,840
8747*	Niukluk River	6-26-71	G	5,100	"	--	2,282
8749*	Delome River	6-26-71	G	18,560	"	0	0
8773	Kuzitrin River	6-29-71	G	23,000	"	0	28,786
8793	Ella	6-29-71	G	25,000	"	0	130
8684	McCarthy Marsh	7-09-72	E	387	"	--	568
8685	Shin Creek	7-09-72	B	5	"	--	2,348
8693	Willow Creek	7-09-72	C	65	"	--	11,848
8900*	Bunker Hill	7-27-72	E	500	"	12	14,899
8850	Libby	8-06-74	C	10	"	0	0
8690	Salmon	7-28-75	E	300	Misc.	72	85,618
8633	Dry Canyon	7-09-77	G	46,000	Lightning	68	155,123
8664	Koyuk	7-15-77	C	20	"	8	85
8665	Koyuk Two	7-15-77	C	15	"	8	138
8789	GMT SSW 16	7-23-77	G	49,920	"	0	7,368
8790	GMT SW 25	7-23-77	A	0**	"	0	0
8791	GMT SW 21	7-23-77	A	0	"	0	0
8788	GMT SSW 17	7-23-77	B	6	"	0	753
8530	GMT SW 50	6-05-79	C	35	"	5	2,704
8534	KKA N 5	6-25-82	D	150	"	68	123,409
8699	Imuk SW 27	7-12-82	A	0	"	2	2,238

* Started outside subunit boundary

** Fires less than 1/4 acre in size are recorded as 0 acres in the computerized fire statistics.

Table 10. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
BENDELEBEN SUBUNIT

	Number of Fires	Number of Fires by Size Class*/ No. of Unmanned Fires A	B	C	D	E	F	G	G**	Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
1956	3			1/1				2/2		20,010	535	635	1,836
1957													
1958													
1959													
1960	3		2	1						28	4,870	5,490	15,872
1961	1			1						77	2,316	2,595	7,473
1962													
1963													
1964													
1965													
1966													
1967													
1968	1		1							1	3,310	3,177	9,185
1969	1			1						50	2,840	2,587	7,479
1970													
1971	4							2/2	2/2	71,660	31,198	25,720	74,357
1972	4		1	1		2				957	29,663	23,674	68,442
1973													
1974	1			1/1						10	0		
1975	1					1				300	85,618	53,113	153,550
1976													
1977	7	2	1/1	2				2/1		95,961	163,467	90,064	260,375
1978													
1979	1			1						35	2,704	1,244	3,596
1980													
1981													
1982	2	1			1					150	125,647	43,461	125,646
Total	29	3	5	9	1	3		6	2	189,239		251,750	727,811
Unmanned	10	0	1	2	0	0		5	2				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.
** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

Imuruk Subunit

The 585,900 acre Imuruk Subunit contains several blocks of land (Figure 7), primarily in the southwest part of the Seward Peninsula. Major blocks include the Kigluaik Mountains; about 200,000 acres north of the Imuruk Basin and two small blocks of land on the northwest coast along Ikpek and Lopp Lagoons.

Only five fires are recorded for this subunit since 1957, one in 1974 and four fires in 1971 (Table 11). The 1974 fire was an August man-caused fire of less than 1/4 acre near Salmon Lake. The 1971 fires, all started between June 24 to 29, and were all north of the Kigluaiks, in the Imuruk Basin. The Seabert fire (#8701) went out by itself at 1,000 acres. The Tuksuk Channel fire (#8752) burned into fire #8751, which together burned about 71,000 acres east of the Agiapuk River. Fire #8770 burned an estimated 100,000 acres west of the Kuzitrin River, and covered about 7,000 acres in the Imuruk Subunit. None of these fires were manned and all were out by July 22. 45% of the approximately 195,000 acres in the block north of the Imuruk Basin burned during this period in 1971, accounting for essentially all of the burned acreage in the subunit since 1956.

It should be noted that some of the same land that burned in 1971 also burned in 1954. A 224,000 acre fire (#11) burned without suppression in the Imuruk Basin from about June 4 to August 4. 96,000 acres in the subunit burned. No action was taken.

The Imuruk Basin appears to be the only area of the subunit with any fire potential, and fire is a rare occurrence, even there. However, dry conditions and lightning storms can result in extremely large, fast spreading fires.

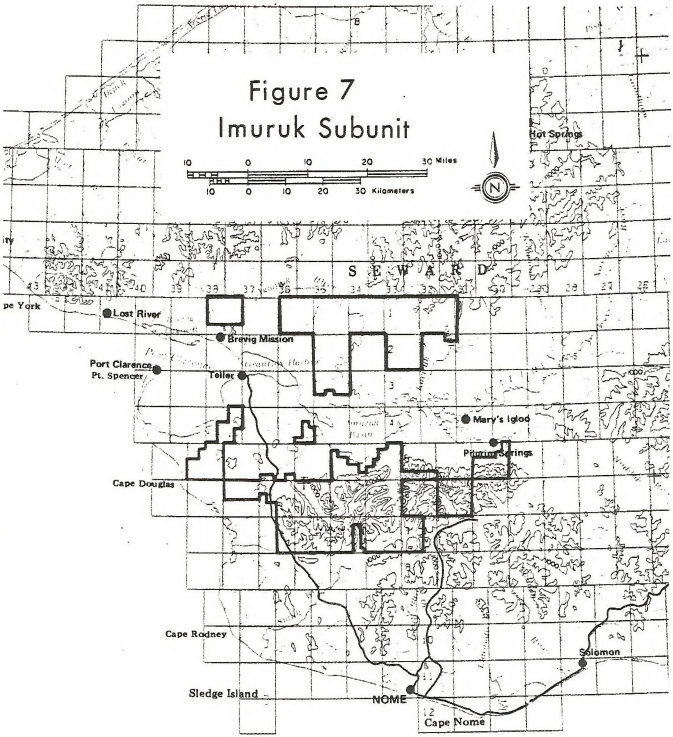
Figure 7
Imuruk Subunit
10 0 10 20 30 Miles
10 0 10 20 30 Kilometers
N
Hot Springs
S E W A R D
Lost River
Brevig Mission
Port Clarence
Pt. Spencer
Teller
Mary's Igloo
Pilgrim Springs
Cape Douglas
Cape Rodney
Solomon
Sledge Island
NOME
Cape Nome

Table 11. FIRE OCCURRENCE: 1956-1982
Northwest Planning Area
IMURUK SUBUNIT

Fire No.	Name	Date	Size Class	Acres in Subunit	Cause	Total Suppression Force	Cost
8701	Seabert	6-24-71	F	1,000	Lightning	0	0
8751*	165-30	6-26-71	G	71,000	"	0	0
8752	Tuksuk Channel	6-26-71	G	"	"	0	3,491
8770*	Anchorage NW 500	6-29-71	G	7,000	"	0	4,605
8568	Salmon Lake	8-06-74	A	0**	Debris Burning	0	58

* Started outside subunit boundary.
** Fires less than 1/4 acre are recorded as 0 acres in the computerized fire statistics.

Table 12. FIRE STATISTICS SUMMARY: 1956-1982
Northwest Planning Area
IMURUK SUBUNIT

	Number of Fires	Number of Fires by Size Class*/ No. of Unmanned Fires A	B	C	D	E	F	G	G**	Acres in Subunit	Total Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
1956													
1957													
1958													
1959													
1960													
1961													
1962													
1963													
1964													
1965													
1966													
1967													
1968													
1969													
1970													
1971	4						1/1	1/1	2/2	79,000	8,096	6,674	19,295
1972													
1973													
1974	1	1/1								0	58	39	113
1975													
1976													
1977													
1978													
1979													
1980													
1981													
1982													
Total	5	1					1	1	2	87,000		6,713	19,408
Unmanned	5	1					1	1	2				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

DISCUSSION

Relative Fire Activity

Of all subunits, the fire activity is greatest in the Sheklukshuk, with the highest number of starts per 100,000 acres, 7.38, and the highest percent of area burned in the last 27 years, 32.9% (Table 13). The Imuruk subunit has the second highest percent of area burned of all of the subunits, 13.48%, and the highest average fire size, 15,800 acres. The average level of fire activity for that unit is quite low, however, because all of that burned acreage occurred in one year, 1971. The Squirrel River subunit has the lowest level of fire activity in the planning area, with a low number of fire starts per 100,000 acres, 1.6, and a tiny amount of burned acreage, only 0.35% of the area, and by far the smallest average size per fire, only 221 acres.

The Buckland subunit has the second highest number of fire starts, 3.81/100,000 acres, but average fire size is lower than any other subunit but the Squirrel, 2,816 acres. Fires in the Selawik Hills and along the Continental Divide account for 83.1% of all burned acreage in the subunit. Average size of all other fires is only 487 acres. However, vegetation patterns in the Buckland Basin suggests that fires have occurred which are much larger than those which have been recorded since 1956. Extreme burning conditions probably develop in that area, but at very infrequent intervals.

The West Nulato Hills and Bendeleben subunits are quite similar in number of fires per 100,000 acres (1.94 and 1.90), percent of area burned (12.33% and 12.42%), and average fire size (6,369 and 6,526 acres), with a level of fire activity which is intermediate for the planning area. However, the fire regime in the western part of the Bendeleben subunit more closely resembles that in the Imuruk subunit than it does the pattern in the rest of the subunit or in the Nulato Hills. Almost all significant fire activity in the western Bendeleben subunit occurred in 1971 at the same time that the Imuruk Subunit burned. The southwestern Seward Peninsula was not affected by the 1977 fires which burned in the central and eastern Bendeleben subunit and in all other parts of the Northwest Planning Area.

It is likely that the maritime influence of Norton and Kotzebue Sounds markedly limits the fire activity in both the Squirrel River and Imuruk subunits, the western Bendeleben subunit, and perhaps in the Buckland River lowland. The Sheklukshuk has a dry climate more typical of interior Alaska, which promotes a higher incidence of fire than in other subunits.

Without fire suppression, it is certain that more acres would have burned, but not all fires would have become large. 41% of all fires in the area were less than ten acres at final size, and at least 35% of those fires went out naturally. Many small fires have been seen during field reconnaissance which were not in the fire records. 21 fires which received no suppression effort grew to between 5,000 and 25,000 acres and then went out. Some of these fires may have rapidly grown to almost their final size, and they had been put out by rainy weather. Other fires probably burned under moderate weather conditions, and would have been put out at a much smaller size if suppression action had been taken. Fires which have been suppressed at a small size may have become very large if hot, dry and windy conditions developed later.

Table 13 - FIRE STATISTICS SUMMARY
1956 - 1982
Northwest Planning Area

Unit & Approx. Acreage	No. of Fires* A	B	C	D	E	F	G	Total # Fires Affecting Unit	Light-ning Fires	% Light-ning	Estimate of Acres Burned	Percent of Area Burned	Starts/ 100,000 Acres	Average Fire Size in Acres
Sheklukshuk 528,720	7	11	5	4	3	3	6	39	38	97.4	176,050	32.91	7.38	4,463
Squirrel River 810,200	1	6	4	0	1	0	1	13	13	100.0	2,869	0.35	1.60	221
West Nulato Hills 1,652,200	1	5	6	3	4	5	8	32	31	96.8	203,798	12.33	1.94	6,369
Buckland** 2,073,600	19	22	13	8	7	6	4	79	79	100.0	222,468	10.83	3.81	2,816
Bendeleben 1,523,180	3	5	9	1	3	0	8	29	27	93.0	189,239	12.42	1.90	6,526
Imuruk 585,900	1	0	0	0	0	1	3	5	4	80.0	79,000	13.48	0.85	15,800
N.W. Planning Area ** 7,173,800	32	49	37	16	18	15	30	197	192	97.46	871,424	12.15	2.75	4,423

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres

** Includes eastern part Buckland HMP Area, outside N.W. Planning Area.

Table 13 - FIRE STATISTICS SUMMARY
1956 - 1982
Northwest Planning Area

Unit & Approx. Acreage	No. of Fires* A	B	C	D	E	F	G	Total # Fires Affecting Unit	Lightning Fires	% Lightning	Estimate of Acres Burned	Percent of Area Burned	Starts/ 100,000 Acres	Average Fire Size in Acres
Shekluksuk 528,720	7	11	5	4	3	3	6	39	38	97.4	176,050	32.91	7.38	4,463
Squirrel River 810,200	1	6	4	0	1	0	1	13	13	100.0	2,869	0.35	1.60	221
West Nulato Hills 1,652,200	1	5	6	3	4	5	8	32	31	96.8	203,798	12.33	1.94	6,369
Buckland** 2,073,600	19	22	13	8	7	6	4	79	79	100.0	222,468	10.83	3.81	2,816
Bendeleben 1,523,180	3	5	9	1	3	0	8	29	27	93.0	189,239	12.42	1.90	6,526
Imuruk 585,900	1	0	0	0	0	1	3	5	4	80.0	79,000	13.48	0.85	15,800
N.W. Planning Area ** 7,173,800	32	49	37	16	18	15	30	197	192	97.46	871,424	12.15	2.75	4,423

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres

** Includes eastern part Buckland HMP Area, outside N.W. Planning Area.

Fire Suppression Effort

The amount of fire suppression effort, indicated by the level of manning, shows that fires in the Northwest Planning Area have apparently not been a high priority. The percent of fires not manned (Table 14) ranges from 15.4% in the Squirrel River (2/13), to 20.5% in the Sheklukshuk (8/39), 34.5% (10/29) in the Bendelebens, 35.4% in the Buckland (28/79), to 40.6% (13/32) in the West Nulato Hills. None of the five fires reported in the Imuruk Subunit were manned. By comparison, for the five subunits of the Central Yukon Planning Area, the highest percentage of unmanned fires is in the Hughes subunit, with 21.69% (18/83) fires never manned. Only three Class G fires in the Northwest Planning Area have received a major suppression effort, all in 1977 (Appendix B). The majority of large fires have received no suppression beyond initial attack, or received partial suppression on critical parts of the fire only.

Fire Suppression Costs

Annual fire suppression costs are highly variable, as is cost per fire. There is a trend in more recent years toward higher costs, as more fires are discovered, more fires are attacked, and the amount of suppression effort increases on fires on which action is taken. Three times as many fires were reported for the period 1970-1982 as were reported for the first 14 years of record, 1956-1969 (Table 15). Thirty fires were manned in that period, compared to 101 fires since 1970. 70.4% of the total burned acreage has occurred since 1970, but 92.7% of all costs (adjusted for inflation) have been incurred in that period. Average fire costs was $6,314 before 1970, and $26,510 per fire since 1970. 42% of all suppression costs resulted from total expenditures on three fires in 1977, the Dry Canyon Fire in the Bendeleben and Darby Mountains (274,085-1982 $); the Pah River Fire in the Pah River Flats ($401,741); and the Kiliovil Fire ($1,129,363), in the Kiliovilik and Sheklukshuk Ranges south of the Kobuk River (Appendix B). If the costs for these three fires are removed from the 1970-1982 cost total, average fire cost for that period becomes $14,795 (1982$), still an increase of $8,481 per fire over the period 1956-59.

The previous discussion used total cost spent on fires which burned acreage within the planning subunits. The following uses figures adjusted to reflect the fact that only a percentage of the total acreage burned by some large fires was within a subunit, and therefore uses only a percentage of total cost for that fire. Fire costs for 1956-1969 are $306,659 (1982 $), and $2,873,645 was spent on fires in 1970-1982, for a total of $3,180,304. Average fire cost before 1970 was $6,258, and costs from 1970 to 1982 were $19,419. Average cost per fire is thus three times higher in recent years than in the earlier years of the period of record. 90.4% of the total cost has been spent on 75% of the fires, which covered 70.4% of the total burned acreage. Fire suppression costs do seem to be rising.

Table 14. FIRE COSTS, BY SUBUNIT
Northwest Planning Unit
1956-1982

Subunit	Number of Fires	Total Acreage	% of Fires Not Manned	Cost in 1967 Dollars*	Adjusted Cost in 1982 Dollars*	Cost per Fire (1982)*	Cost per Subunit Acre*
Shekluksbuk	39	528,720	20.5	367,909	1,063,624	27,272	$2.01
Squirrel River	13	810,200	15.4	47,600	137,612	10,586	$0.17
West Nulato Hills	32	1,652,200	40.6	147,384	426,086	13,315	$0.26
Buckland	79	2,073,600	35.4	289,396	836,644	10,590	$0.40
Bendeleben	29	1,523,180	34.5	249,203	720,445	24,843	$0.47
Imuruk	5	585,900	100.0	2,891	8,358	1,672	$0.014
Planning Area	197	7,173,800	97.46	1,104,382	3,192,769	16,207	$0.45

* Costs have been adjusted for large fires that burned both on BLM and other agency lands. A percentage of total cost was used that is proportional to the percentage of the total burned acres that occurred on BLM administered lands.

Among subunits, the cost of fire suppression was greatest in the Sheklukshuk subunit in terms of total dollars spent (over $1 million), average costs per fire ($27,272) and cost per subunit acre, about $2.01 (adjusted acreage) (Table 14). The second highest suppression costs were found in the Bendeleben subunit, with an average cost per fire of $24,483 and cost per subunit acre of $0.47. The lowest amount of suppression dollars were spent in the Imuruk subunit, which only had five fires, none of which were manned. Average fire cost was $1,672 (1982 $) and cost per subunit acre was only $0.014.

Average cost per fire in Sheklukshuk was about $2,400 higher than in the subunit with the second highest costs, Bendeleben. However, costs per subunit acre were more than four times higher in Sheklukshuk than in Bendeleben, reflecting the high density of fires in Sheklukshuk. Also, a higher percentage of those fires were manned in Sheklukshuk than in most of the other subunits.

Squirrel River, West Nulato Hills and Buckland ranked variously third, fourth and fifth both in terms of average fire cost and cost per subunit acres. Fire costs were much lower than Bendeleben, but costs per subunit acre did not vary significantly.

A more detailed cost analysis is not possible because of the highly unequal spread of suppression costs among fires of fairly equivalent size, caused by differences in attack priority and suppression strategy and tactics. Based upon natural resource values, a much lower level of suppression effort could frequently have been justified.

PLANNING AREA SUMMARY

In the past 27 years, 197 fires occurred on BLM lands, 192 (97.5%) of which were lightning caused; 12,650 acres, or 1.4% of the total burned acreage, resulted from man caused fires (Appendix C). The only fire to occur in the Northwest Planning Area before May 29 was a man caused fire on May 19 (Table 16).

Fires have burned a total of 871,424 acres in the planning area, about 12.15% of the entire area. Average fire size was 4,423 acres (Table 13).

Much of the Planning Area is prone to extremely large fires. Approximately 63% of the total burned acreage has resulted from only eight of the 197 fires which have occurred.

Fires have occurred somewhere in the planning area in 22 of the past 27 years. Burned acreage exceeded 10,000 acres in seven years: 1956, 1957, 1959, 1968, 1970, 1971 and 1977. However, in only three years, 1957, 1972, and 1977 did more than 150,000 acres burn (Table 15).

The fire season lasts from early June until late July in most years (Table 16). Fires have continued to burn in late August and early September in 1957, 1972, and 1977, in all subunits but the Imuruk (Appendix B). The rains which normally fall in July and August and bring an end to the fire season, apparently did not occur in those years.

Fire suppression has not been a high priority, with no manning on at least 34% of the fires which were detected. In recent years, final size of fires which were not suppressed ranged from less than 1/4 acre to 69,000 acres.

Suppression costs have been much higher since the late 60's than in previous years. More fires are being detected and the level of suppression effort has increased. Large fires received no or only limited amounts of suppression until 1977. In that year, suppression actions on three large fires contributed to a suppression cost for fires affecting the planning area that was five times as high as in any other year.

Table 15. FIRE OCCURRENCE, SIZE, and COST SUMMARY
Northwest Planning Area
1956-1982

Year	Total	No. of Fires by Size Class*/ No. of Unmanned Fires								Acres	Cost	Cost in 1967 Dollars***	Cost in 1982 Dollars
		A	B	C	D	E	F	G	G**				
1956	4/4			1/1	1/1			2/2		20,210	555	658	1,902
1957	2/2							1/1	1/1	206,360	1,204	1,428	4,128
1958	8/3		2/1	2	4/2					1,030	2,169	2,505	7,242
1959	4/2					1	1	1/1	1/1	11,880	10,514	12,044	34,819
1960	6		3	1		1	1			3,188	25,947	29,253	84,570
1961	1			1						77	2,316	2,585	7,473
1962	0									0	0	0	0
1963	1/1		1/1							2	0	0	0
1964	1				1					150	4,523	4,869	14,076
1965	1			1						75	1,186	1,255	3,628
1966	2		1	1						83	9,620	9,897	28,612
1967	0									0	0	0	0
1968	18/7	3	3	4/2	2	1/1	4/4	1		15,056	41,610	39,933	115,446
1969	1			1						50	2,840	2,587	7,479
1970	18/3	4/1	3/1	3/1	2	1	3	2		35,385	145,490	125,099	361,661
1971	17/9			3/1		3	3/1	4/3	4/4	164,320	143,605	118,388	342,260
1972	18/5		2	3	1/1	4/2	2/1	6/1		99,233	168,536	134,506	388,857
1973	0									0	0	0	0
1974	30/14	10/8	13/5	4/1	1	2				1,282	103,332	69,961	202,257
1975	1					1				300	85,618	53,113	153,550
1976	5	4				1				700	53,563	31,415	90,821
1977	28/6	4	9/2	5		2/1	1/1	4/2	3	310,261	1,286,635	708,889	2,049,398
1978	0									0	0	0	0
1979	17/8	4/4	7/3	3/1	3					827	67,312	30,962	89,511
1980	0									0	0	0	0
1981	7/2	1	4/2	1		1				724	62,894	23,089	66,750
1982	7	2	1	3	1					231	178,346	61,690	178,346
Total	197	32	49	37	16	18	15	21	9	871,424		1,464,126	4,232,786
Unmanned	66	13	15	7	4	4	7	10	6				

* A = 0-0.25 acres, B = 0.26-9 acres, C = 10-99 acres, D = 100-299 acres, E = 300-999 acres, F = 1000-4999 acres, G = 5000+ acres.

** Fires greater than 5,000 acres which started outside the subunit boundary, but burned acreage within the subunit.

***Cost adjustment factors are found in Appendix A.

TABLE 16 - FIRE SEASONALITY, BY SUBUNIT
1956 - 1982
NORTHWEST PLANNING AREA

Subunit	Earliet Fire	Latest Fire	Date When % of Fire Starts Have Occurred				Dates When Fires Burning % of Acres Have Begun			
			60 %	70 %	80 %	90 %	60 %	70%	80 %	90 %
Sheklukshuk	6-06-79	9-09-58	7/2	7/4	7/16	7/24	7/16	7/16	7/16	7/16
Squirrel River	6-09-60	8-06-74	7/24	7/25	7/31	8/1	7/25	7/25	7/25	7/25
West Nulato Hills	5-19-60*	8-25-68	7/16	7/24	7/25	8/10	7/23	7/24	7/24	7/24
Buckland	6-02-58	8-06-74	7/9	7/12	7/16	7/18	6/10	7/4	7/15	7/16
Bendeleben	5-29-61	8-06-74	7/15	7/21	7/23	7/27	7/9	7/11	7/23	7/23
Imuruk	6-24-71	8-06-74*	6/26	8/6	8/6	8/8	6/26	6/26	6/26	6/26

* Man-caused.

Appendix A.

Consumer Price Index - U.S. Cities Average

Year	Cost Adjustment Factor
1957*	.843
1958	.866
1959	.873
1960	.887
1961	.896
1962	.906
1963	.917
1964	.929
1965	.945
1966	.972
1967	1.000
1968	1.042
1969	1.098
1970	1.163
1971	1.213
1972	1.253
1973	1.331
1974	1.477
1975	1.612
1976	1.705
1977	1.815
1978	1.954
1979	2.174
1980	2.468
1981	2.724
1982	2.891

* The 1957 factor was used to adjust 1956 costs, because no cost adjustment factor has been calculated for 1956.

CLASS G FIRE ACTIVITY
(Greater Than 5,000 Acres)
NORTHWEST PLANNING AREA
1956 - 1982

Fire No.	Name	Date Started	Date Controlled	Date Out	Total Acres	Estimated Acres Burned in Subunit	Cause	Total Suppression Force	Cost
Sheklukshuk Subunit									
219	Shungnak	6-20-59		7-10-59	5,000	2,000	Misc.	0	0
218*	Angutikaka Peak	6-30-59		7-09-59	8,960	6,400	"	0	0
9937	Cascade Lake	7-15-70	7-20-70	8-15-70	14,480	14,480**	Lightning	64	57,580
8673	Pah River	7-08-72		8-29-72	86,720	41,600	"	14	29,171
8705	Kiliovil	7-16-77	9-11-77	9-12-77	171,000	97,920	"	303	709,027
8889*	Pah River	7-30-77	9-13-77	9-18-77	47,000	1,000	"	92	252,217
Squirrel River Subunit									
8837*	OTZ NE 40	7-24-77	8-18-77	8-25-77	25,000	2,000	"	85	67,584
West Nulato Hills Subunit									
94	Ungalik	6-09-57		9-10-57	65,920	63,000	"	0	316
Z77	Christmas Creek	7-23-68			6,000	6,000	"	--	1,730
8761	Inglutalik River	6-28-71	7-07-71	7-08-71	6,500	6,500	"	28	13,557
8676	Akulik River	7-08-72	7-13-72	7-14-72	13,000	13,000	"	93	14,183
8677	Little Bear	7-08-72	7-14-72	7-18-72	8,680	8,680	"	65	38,961
8680	Cable	7-07-72	7-14-72	7-16-72	14,000	14,000**	"	14	15,516
8692	Nigikmigoon	7-09-72	7-16-72	7-19-72	10,200	10,200	"	14	8,926
8827	GMT ESE 42	7-24-77		9-19-77	69,000	69,000	"	0	3,367

* Started outside subunit boundary.
** No fire map available.

Fire No.	Name	Date Started	Date Controlled	Date Out	Total Acres	Estimated Acres Burned in Subunit	Cause	Total Suppression Force	Cost
Buckland Subunit									
98*	Kateel River No. 1-5	6-10-57		9-10-57	1,161,200	143,360	Lightning	0	888
9632	Meander	7-04-70			9,850	9,850	"	--	420
8720	Tire	7-10-72		7-17-72	6,000	6,000	"	0	0
8689*	Augus	7-16-77	9-12-77	9-19-77	270,000	41,600	"	67	15,842
Bendeleben Subunit									
007	Koyuk No. 1	6-21-56			12,000	12,000**	"	--	252
0011	Kuzitrin	7-11-56			8,000	8,000**	Misc.	--	283
8749*	Delome River	6-26-71		7-22-71	61,440	18,560	Lightning	0	0
8747*	Niukluk River	6-26-71		7-22-71	9,600	5,100	"	0	2,282
8748*	West Fork	6-26-71		7-22-71	2,560		"	0	608
8773	Kuz River	6-29-71		7-22-71	23,000	23,000	"	0	28,786
8793	Ella	6-29-71		7-22-71	25,000	25,000	"	0	130
8633	Dry Canyon	7-09-77	7-29-77	8-05-77	46,000	46,000	"	68	155,123
8789	GMT SSW 16	7-23-77		8-03-77***	70,000	49,920	"	0	7,368
Imuruk Subunit									
8751*	165-30	6-26-71		7-22-71	58,520	71,000	"	0	0
8752	Tuksuk Channel	6-26-71		7-22-71	20,480		"	0	3,491
8770	Anchorage NW 400	6-29-71		7-22-71	100,000	7,000	"	0	4,605

* Started outside subunit boundary.
** No fire map available.
*** Fire burned into another fire and declared out.

MAN CAUSED FIRES

1956 - 1982

Northwest Planning Area

Year	Subunit	Fire Number	Fire Name	Acres	Cause	Total Suppression Forces	Cost
7-11-56	Bendeleben	0011	Rainbow	8,000	Misc.	0	0
6-20-59	Shekluk shuk	219	Shungnak	2,000	Misc.	0	0
5-19-60	West Nulato Hills	22	Christmas Mountain	2,350	Recr.	0	$13,113
8-06-74	Imuruk	8568	Salmon Lake	0	Debris Burning	0	$58
7-28-75	Bendeleben	8690	Salmon	300	Misc.	72	$85,618